U.S. Patent Appl. No. 09/855,717
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re PATENT APPLICATION OF

HANNA et al. Group Art Unit: 1644

Application Serial No. 09/855,717 Examiner: Philip Gambel

Filed: July 28, 2000

Title: TREATMENT OF B CELL MALIGNANCIES USING COMBINATION OF B CELL DEPLETING ANTIBODY AND IMMUNE MODULATING ANTIBODY RELATED APPLICATIONS

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DECLARATION BY KANDASAMY HARIHARAN, PH.D., D.V.M. PURSUANT TO 37 C.F.R. § 1.132

1. I am a senior scientist at Biogen Idec Inc.

2. My laboratory and office are currently located at Biogen Idec Inc. (hereinafter "Biogen Idec"), 3010 Science Park Road, San Diego, California 92121, USA.

4. I earned a doctorate of philosophy in immunology at the University of Nebraska Medical Center in 1991 and a doctorate of veterinary medicine at the College of Veterinary Medicine, University of Peradeniya, Sri Lanka, in 1984. A copy of my curriculum vitae is attached.

5. I have worked in the field of immunology for the past 15 years, with a focus in pre-clinical development of therapeutic antibodies for the past 10 years.

6. I am a named co-inventor of U.S. Patent Application No. 09/855,717.

7. I have reviewed the official action dated September 2, 2003, issued in connection with U.S. Patent Application No. 09/855,717.

8. I have also reviewed each of the references cited by the examiner, *i.e.*, U.S. Patent No. 6,287,537 to Kaminski et al. (Kaminski), U.S. Patent No. 5,843,439 et al. to Anderson et al. (Anderson), Gruss et al. (1997) *Leukemia & Lymphoma* 24:393-422 (Gruss), Carbone et al. (1995) *American Journal of Pathology* 147:912-922 (Carbone), and U.S. Patent No. 6,001,358 to Black et al. (Black).

9. I disagree with the examiner's conclusion that, based on a review of the above-noted references, a scientist could successfully perform, or even hold a reasonable expectation of success in performing, methods for treating CD40+ B cell malignancies by administration of an anti-CD40L antibody which blocks CD40/CD40L signaling.

10. Initially, I note that the Kaminski and Anderson patents are directed to the use of anti-CD20 antibodies for cancer therapy, but do not pertain to therapy by blockade of CD40/CD40L signaling.

11. Immunotherapies based on a particular cancer antigen, *e.g.*, CD20, cannot be generalized as teaching currently undeveloped therapies using any cancer antigen, *e.g.*, anti-CD40L therapies.

12. A novel aspect of the present invention is that an anti-CD40L antibody, which binds the gp39 T cell antigen, inhibits the cell protective effect of CD40/CD40L signaling in malignant B cells, to thereby enhance the effectiveness of cytotoxic agents, for example, chemotherapeutic agents such as adriamycin.

13. Figure 2A of the application is a bar graph which shows that (1) adriamycin (ADM) induces cytotoxicity of B lymphoma cells (columns 2-3), (2) soluble CD40L (gp39) inhibits ADM-induced cytotoxicity (columns 5-6), and (3) anti-CD40L antibody blocks this survival mechanism (columns 7-8).

14. These results were surprising and could not have been predicted prior to the present invention because, at the time of filing the instant application, there were contrary reports regarding the role of CD40/CD40L signaling in normal cells and malignant cells.

15. The journal article by Carbone describes detection of CD40 antigen on B lymphoma cells and detection of CD40L on T cells, which distribution is also observed in normal B cells and T cells.

16. Based on the similar expression profile in normal and malignant cells, and the known role for CD40/CD40L signaling in activating B cells, Carbone proposes that CD40/CD40L signaling may also be important for T cell activation of malignant B cells. *See* p. 920, col. 1, ¶ 1.

17. However, Carbone does not demonstrate the function of CD40/CD40L signaling in malignant cells.

18. Carbone expressly acknowledges the interpretational limitations of this study, stating that "[t]he functional significance of the expression of CD40L on reactive T lymphocytes of B-cell NHL also deserves speculation." *See* page 920, col. 1, lines 16-18 (emphasis added).

19. The function of a protein cannot be established by expression data, which merely invites experimentation to determine protein function in those cells where it is expressed.

20. The journal article by Gruss describes inhibition of B cell proliferation in the presence of recombinant CD40L, which suggests a role for CD40/CD40L signaling in malignant cells, *i.e.*, an anti-proliferative or pro-apoptotic effect, which is directly opposite to that observed in normal cells.

21. Our experimental results show that CD40/CD40L signaling in malignant B cells has a protective effect similar to that observed in normal B cells and opposite to that described by Gruss.

22. The Black patent describes anti-CD40L (GP39) antibodies and their use in treating autoimmune disease, which does not pertain to the treatment of B cell malignancies.

23. In conclusion, the activity of an anti-CD40L antibody in effectively blocking cell survival mechanisms of B lymphoma cells could not have been predicted prior to performance of the methods of the present disclosure.

24. All statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

March 02. 2004
Date

Kandasamy Hariharan, Ph.D., D.V.M.

Curriculum Vitae

Hari K. Hariharan, Ph.D

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3010 Science Park Road,
San Diego, CA 92121
E-mail:Hari.Hariharan.biogenidec.com
Office: (858) 431-8545
Fax: (858) 431-8752

Personal: Married
US Citizen

Summary: Scientist with 10 years of experience in research and pre-clinical development of therapeutic antibodies and vaccines in oncology and autoimmunity. Have experience in project leadership and management.

EDUCATION

Ph.D., Immunology:	University of Nebraska Medical Center, Omaha, NE, 1991
M.S., Veterinary Sciences:	University of Nebraska Lincoln, NE, 1988
D.V.M., (Honors):	College of Veterinary-Medicine, University of Peradeniya, Sri Lanka, 1984

PROFESSIONAL EXPERIENCE

Biogen IDEC

Sr. Scientist I	2003 - Present

IDEC Pharmaceutical Corporation 1991 - 2003

Sr. Scientist I	1999 – 2003
Scientist II	1996 –1999
Scientist I	1994 –1996
Sr. Research Associate II	1993 –1994
Postdoctoral Fellow	1991 –1993

IDEC Pharmaceuticals Corporation, San Diego, CA
Sr. Scientist I **1999 – 2003**

- Contributed to the development of a prostate cancer vaccine program. I played a lead role in establishing the CRADA with NIH on the prostate cancer gene discovery. Collaborated with the NIH scientists (Dr. Ira Pastan's lab) in validating these targets for vaccine. Two novel tumor targets (PAGE-4 and TARP) were selected for the prostate cancer vaccine development. I served as the project leader of this project.

- Conducted the "proof-of-concept" experiments to support the combination of IDEC-114 (anti-CD80)/Rituxan treatment in non-Hodgkin's lymphoma. Wrote the pre-clinical study report for IND submission. IDEC-1114 is currently in Phase II for NHL.

- Conducted "proof-of-concept" experiments to support the initiation of clinical trials on IDEC-152 (anti-CD23) in chronic lymphocytic leukemia. Provided pre-clinical study reports for IND submission. IDEC-152 is currently in Phase II for CLL.

- Established criteria (prior to IDEC gene discovery team) and validated novel tumor targets for the development of therapeutic antibodies against prostate and colon cancer.

- Continue to act as an intellectual resource and provided up-to-date information to research groups concerning practical concepts, technologies, research strategies and feasibility issues. I have reviewed and provided input to the appropriate committee(s)/individuals on several internal and external product opportunities.

- Supervised junior level scientist and maintained effective reporting structure to maximize communication, team work and goal achievement.

IDEC Pharmaceuticals Corporation, San Diego, CA
Scientist II **1996 – 1999**

- Established critical animal tumor models for the *in vivo* evaluation of therapeutic antibodies, small molecules and vaccines against different malignancies (Lymphoma, Prostate and Colon).

- Performed the proof-of-concept studies for homo and heterodimeric antibodies of C2B8 (Rituxan) and p5E8 (IDEC-152). Developed additional improved methods for apoptosis detection (Tunnel, Casapse-3) and implemented to test dimers on B-lymphoma cell lines.

- Demonstrated IDEC-152's ability to induce apoptosis in B-lymphoma cell lines. IDEC-152 is currently in the clinical trials for CLL. Obtained a SBIR Phase I grant to evaluate dimeric anti-CD23 antibodies in CLL.

- Conducted non-human primate studies: In collaboration with the pre-clinical development group designed experiments, wrote protocols and implemented studies to meet departmental/corporate goals. Evaluated the immunosuppressive effects of IDEC's product candidate, humanized anti-CD154 antibody (IDEC-131) in macaques to support IND submission. This product progressed to Phase II clinical trials in patients with SLE & ITP.

- To support project activities performed immunolobiologyical assays using human lymphocytes to characterize product candidates (IDEC-131/humanized anti-CD154 antibody, IDEC-114/primatized

anti-B7.1 antibody and IDEC-152/anti-CD23 antibody); immunosuppression (MLR), cytokine profile (TH1 Vs TH2), in vitro Ig production and apoptosis.

- Managed projects for external collaborations, specifically acted as the point person on the collaboration with Corixa Corp. on prostate cancer target validation for antibody development.

IDEC Pharmaceuticals Corporation, San Diego, CA
Scientist I **1994-1996**

- In support of an IND submission, evaluated the immunosuppressive and T cell non-depleting properties of a non-depleting version of primatized anti-CD4 antibody (IDEC-151) in chimpanzees. This product progressed to Phase II clinical trials in patients with rheumatoid arthritis.

- Optimized and evaluated immune responses (CTL and antibody responses) induced by experimental vaccines containing soluble tumor antigens (Ovalbumin) in IDEC's proprietary adjuvant formulation (PROVAX) in animal tumor models. Developed syngeneic murine tumor models for the evaluation of human papillomavirus (HPV) vaccines and tested HPV protein (E6, E7, L1) in PROVAX for vaccine development.

- Developed a human IgE/SCID mouse model to determine the IgE inhibiting property of anti-CD23 antibody product candidates *in vivo*.

IDEC Pharmaceuticals Corporation, San Diego, CA
Senior Research Associate II **1993-1994**

- Performed *in vitro* studies to determine the apoptosis inducing potential of anti-CD20 antibody (IDEC-C2B8 or Rituxan). Collaborated with Dr. Benjamin Bonavida at UCLA. My experimental results were the first to demonstrate the apoptosis inducing potential of Rituxan. Developed protocols for functional assay screening, such as proliferation inhibition, cytotoxicity, apoptosis (Laddering, PI/FACS, PI/Acridine Orange staining) involving antibody cross-linking of antibodies. This product has been currently marketed for the treatment of non-Hodgkin's lymphoma.

- Worked with the Vice President of R&D and HR in establishing the tumor immunology group, which included setting-up of a research laboratory, writing up research goals and hiring of key individuals.

IDEC Pharmaceuticals Corporation, San Diego, CA
Postdoctoral Fellow **1991-1993**

- In support of an IND and a Phase I clinical trial on therapeutic anti-idiotype antibodies for HIV-disease developed and characterized several monoclonal anti-idiotype antibodies specific to human anti-gp120 antibodies to identify new lead candidate antibodies.

- First to demonstrate that immunization with gp120-CD4 complex protects the conformation sensitive neutralizing epitopes of gp120, a strategy for vaccine development.

- Evaluated B-cell clonotypic response in HIV-infected asymptomatic individuals using anti-idiotypes.

Department of Veterinary Sciences, University of Nebraska, Lincoln, NE
Graduate Research Assistant **1985-1991**

- Developed and evaluated anti-idiotype and viral recombinant proteins based vaccines for bovine respiratory diseases induced by bovine herpesvirus-1 (α-herpesvirus).
- Participated in the development of methods and reagents to evaluate immune responses in swine and evaluated anti-idiotype vaccines for transmissible gastroenteritis in pigs.
- Taught Advanced Techniques in Immunology course to the graduate students

Department of Animal Sciences, University of Peradeniya, Sri Lanka
Assistant Lecturer **1984-1985**

- Taught animal reproductive physiology to the D.V.M. and B.S. Agriculture students (laboratory and lectures). Performed basic research in endocrinology aimed at effective breeding of farm animals.

AWARDS

Gold Medal in Veterinary Parasitology, 1983
Norden Animal Health Research Award, 1988
Modern Veterinary Products Laboratories Animal Health Research Award, 1988
Dean of the Graduate College Award, 1989
Widaman Trust Distinguished Graduate Student Award, 1989
Susan Ann Smith Mills Memorial Award, 1990
Governor's Biotechnology Research Fellowship, 1989-1991
Employee Recognition Award, 1994

GRANTS

1. "Therapeutic anti-CD23 antibody dimers for chronic lymphocytic leukemia". NIH SBIR I (R43 CA 81847-01) Principal Investigator. June 1999-Dec 1999, $100,000. Principal Investigator.
2. "Humanized anti-gp39 antibody for autoimmunity/graft rejection: Characterization and pre-clinical testing". NIH SBIR Phase II grant (2R44AI39326-02), September 1997-99, $750,000. Co-Investigator.
3. "Broadly RSV neutralizing human monoclonal antibodies" NIH SBIR Phase II grant (2R44AI36027-02A1), July 1996-1998, $750,000. Co-Investigator
4. "The anti-idiotype antibody approach for an HIV vaccine" NIH Phase II SBIR grant (2R44AI31310-02), September 1992-94, $500,000. Principal Investigator

PROFESSIONAL MEMBERSHIPS

American Association of Cancer Research (1999)
American Association for the Advancement of Science (1994)

PROFESSIONAL JOURNAL DUTIES

Currently Reviewer for *Pharmaceuticals Research (2003)*
Reviewed articles for *American J. Vet. Res. (1990), Journal of Virology (1994) and Intl. J. Oncology (1999)*

Management and leadership Training

Management of multiple projects
Coaching and counseling for improved performance
Building a high performance team
Motivating the team... creating an environment to keep the sprit alive
Time management and delegation
Effective interviewing and leadership

Since 1994, I have directly supervised and managed 2 to 4 individuals at any given period
Managed a multidisciplinary research projects in oncology (cancer vaccines)

PUBLICATIONS

1. **Hariharan, K.** Anti-idiotypes as immunogens against transmissible gastroenteritis virus (TGEV) – an exploratory study. M.S. Thesis, University of Nebraska (1988).

2. **Hariharan, K.,** S. Srikumaran, R.A. Moxley, F.A. Osorio and A. A. Morales Induction of neutralizing antibodies to transmissible gastroenteritis virus (TGEV) by anti-idiotypic antibodies. *Viral Immunol.* (1989) 2:133-42.

3. Srikumaran, S., E.A. Kluever, D.V. Onisk and **K. Hariharan**. Quantitation of bovine immunoglobulins in culture fluids by sandwich radioimmunoassay using monoclonal antibodies. *Am. J. Vet. Res.* (1991) 52:243.

4. **Hariharan, K.** Antigenic mimicry of Bovine Herpesvirus-1 by anti-idiotypic antibodies. Ph.D. Thesis, University of Nebraska (1991).

5. **Hariharan, K.,** M.J. Hariharan, T.J. Zamb, R.J. Krueger and S. Srikumaran. Bovine monoclonal anti-idiotypes induce antibodies specific for a synthetic peptide bearing a neutralizing epitope of bovine herpesvirus-1 glycoprotein gl (gB). *J. Immunol.* (1991) 146:3489-95.

6. **Hariharan, K.,** P.L. Nara, V.M. Caralli, F.L. Norton, N. Haigwood and C-Y. Kang. Analysis of cross-reactive anti-gp120 antibody population in HIV-infected individuals. *J. Virol.* (1993) 67:953-60.

7. Kang, C-Y, **K. Hariharan,** M.R. Posner and P.L. Nara. Identification of a new neutralizing epitope conformationally affected by attachment of CD4 to gp120. *J. Immunol.* (1993) 151:449-57.

8. **Hariharan, K.,** P.L. Nara, L.A. Shabazz, J.A. McCutchan and C-Y. Kang. Analysis of B cell repertoire specific to the neutralizing epitopes of gp120 in HIV-infected individuals. *AIDS Res. Human Retroviruses* (1994) 10:1629-37

9. Kang, C-Y, **K. Hariharan,** P.L. Nara, J. Sodroski and J.P. Moore. Immunization with soluble CD4-gp120 complex preferentially induces neutralizing anti-human immunodeficiency virus type 1 antibodies directed to conformation-dependent epitopes of gp120. *J. Virol.* (1994) 68:5854-62.

10. **Hariharan, K.,** G.R. Braslawsky, A. Black, S. Raychaudhuri and N. Hanna. The induction of cytotoxic T cells and tumor regression by soluble antigen formulation. *Cancer Res.* (1995) 55:3486-9.

11. Demidem, A., T. Lam, S. Alas, **K. Hariharan, N.,** Hanna, B. Bonavida. Chimeric anti-CD20 (IDEC-C2B8) monoclonal antibody sensitizes a B cell lymphoma cell line to killing by cytotoxic drugs. *Cancer Biotherapy and Radiopharmaceuticals.* (1997) 12:177-86.

12. **Hariharan, K.,** G. Braslawsky, R.S., Barnett, L.G. Berquist, T. Huynh, N. Hanna, A. Black. Tumor regression in mice following vaccination with human papillomavirus E7 recombinant protein in PROVAX. *Intl. J. Oncol.* (1998) 12:1229-35.

13. **Hariharan, K.** and N. Hanna. Development and application of PROVAX adjuvant formulation for subunit cancer vaccines. *Adv Drug Delivery Reviews.* (1998) 32:187-97.

14. Zatechka, D.S., N.R. Hegde, **K. Hariharan** and S. Srikumaran. Identification of murine cytotoxic T lymphocyte epitopes of bovine herpesvirus-1. *Vaccine.* (1999) 17:686-94.

15. Nakumura, T., W. Kloetzer, P. Brams, **K. Hariharan,** S.Chamat, X. Cao, M. LaBarre, P. Chinn, R. Morena, B. Shestoswsky, Y-P. Li, A. Chen and M. Reff. In vitro IgE inhibition in B cells by anti-CD23 monoclonal antibodies is functionally dependent on Fc domain. *Intl. J. Immunopharmacol.* (2000) 22:131-41

16. Newman, R., **K. Hariharan,** M. Reff, D.R. Anderson, Braslawsky et al., Modification of Fc region of a primatized IgG antibody to human CD4 retains its ability to modulate CD4 receptors but does not deplete $CD4^+$ T cells in chimpanzees. *Clinical Immunol.* (2001) 98:164-174.

17. Brams, P., A. Black, E.A. Padlan, **K. Hariharan,** K. Slater, J. Leonard, R. Noelle and R. Newman. A humanized anti-human CD154 monoclonal antibody blocks CD154-CD40 mediated human B cell activation. *Intl. J. Immunopharmacol.* (2001) 1(2): 277-94.

18. Reff, M., **K. Hariharan,** G. Braslawsky. Future of monoclonal antibodies in the treatment of hematological malignancies. *Cancer Control.* (2002) 9:152-66.

19. Sheik N.A., G.S. Attard, N. van Rooijen, P. Rajananthanan, **K. Hariharan,** Y-W Tyang and W.J.W. Morrow. Differential requirements for CTL generation by novel immunostimulants: APC tropism, use of the TAP independent processing pathway and dependency on CD80/CD86 costimulation. *Vaccine* (2003) 21:3775-88.

20. Younes, A., **K. Hariharan,** R.A. Allen and B.R. Leigh. Initial trials of anti-CD80 monoclonal antibody (Galiximab) therapy for patients with relapsed or refractory follicular lymphoma. *Clinical Lymphoma.* (2003) 3(4): 257-9.

21. Pathan, N., L. Berquist, T. Murphy, P. Chu, A. Zhou, L. Scales, M. Reff, J. Giri, G.R. Braslawsky, M. Khery, N. Hanna and **K. Hariharan.** Apoptosis and anti-tumor activity induced by Lumiliximab (IDEC-152), an anti-CD23 antibody in $CD23^+$ B lymphoma cell lines. *Submitted Molecular Cancer Therapeutics* (2004)

22. Nuzhat I. Pathan, Peter Chu, Lisa Berquist, Loic Scales, Bryan Leigh, Judith Giri, Mitchell Reff, Paul Grint, Marilyn R. Kehry, **K. Hariharan**, and Nabil Hanna. Induction of Apoptosis by an anti-CD23 monoclonal antibody, Lumiliximab (IDEC-152), in CLL cells. *Submitted to Blood* (2004)

23. **Hariharan, K.**, D. Anderson, Bryan Leigh, L. Berquist, T. Murphy, J.E. Leonard, G. Braslawsky and N. Hanna. (2003). Antibody combination of IDEC-114 (anti-CD80) and Rituximab (Rituxan®) in B-Cell lymphoma therapy. *In Preparation.*

PATENTS

1. Hanna, N., G. Braslawsky and **K. Hariharan**. Synergistic composition and methods for treating neoplastic or cancerous growth and restoration or boosting hematopoiesis. PCT/US98/18495, WO 99/13912.

2. Braslawsky, G., N. Hanna and **K. Hariharan,** M. LaBarre, T Huynh. Production of tetravalent antibodies. PCT/US00/01893, WO 00/44788.

3. Hanna, N and **K. Hariharan**. Treatment of B cell malignancies using anti-CD40L antibodies in combination with anti-CD20 antibodies and/or chemotherapeutics and radiotherapy. PCT/US00/30426, WO 01/34194.

4. Hanna, N and **K. Hariharan.** Treatment of B cell malignancies using combination of B cell depleting antibody and immune modulating antibody related applications. PCT/US01/15677, WO 02/004021.

5. **Hariharan, K** and Hanna. Use of immunoregulatory antibodies in the treatment of neoplastic disorders. PCT/US02/02621, WO 02/060485.

6. **Hariharan, K.**, N. Hanna, G. Braslawsky and N. Pathan. Use of CD23 antagonists for the treatment of neoplastic disorders. PCT/US02/02620, WO 02/060484.

7. **Hariharan, K.**, N. Hanna. Anti-CD80 antibody having ADCC activity for ADCC mediated killing of B cell lymphoma cells alone or in combination with other therapies. PCT/US02/36226, WO 03/039486.

8. Braslawsky, G. N. Hanna, P. Chinn and **K. Hariharan**. Engineered tetravalent antibodies and methods use. PCT/US02/02374, WO 02/096948

Recent Abstracts/Presentations (2001-2003)

1. **Hariharan, K.**, L. Berquist, T. Murphy, G. Braslawsky, N. Hanna and B. Leigh. Pre-clinical evidence for therapeutic efficacy of a PRIMATIZED anti-CD80 antibody (IDEC-114) in non-Hodgkin's lymphoma (NHL). *Eighth International Conference on Malignant Lymphoma, Lugano-Switzerland. June 12-15,2002.*

2. Pathan, N. M. Hopkins, A. Saven, M. Reff, P. Grint and **K. Hariharan.** Induction of apoptosis by IDEC-152 (anti-CD23) in chronic lymphocytic leukemia. IX *International workshop in chronic lymphocytic leukemia. San Diego, CA, USA. March 22-23.2002*

3. **Hariharan, K.**, L. Berquist, T. Murphy, N. Hanna and G. Braslawsky. Antibody combination of IDEC-114 (anti-CD80) and Rituximab (Rituxan®) in B-cell lymphoma therapy. *93rd Annual Meeting of American Association of Cancer Research. SF, CA., USA. April 6-10, 2002. Abstract # 4510.*

4. Pathan, N. **K. Hariharan**, L. Berquist, M. Hopkins, A. Saven, M. Reff, P. Grint and N. Hanna. Induction of apoptosis by IDEC-152 (anti-CD23) in chronic lymphocytic leukemia.. *93rd Annual Meeting of American Association of Cancer Research. SF, CA., USA. April 6-10, 2002. Abstract # 4982.*

5. Rudolf, M., S. Tamraz, G. Braslawsky, N. Hanna and **K. Hariharan.** The induction of cytotoxic T cells and tumor regression by vaccination with recombinant protein in PROVAX™ adjuvant.. *93rd Annual Meeting of American Association of Cancer Research. SF, CA., USA. April 6-10, 2002. Abstract # 1397*

6. **Hariharan, K.**, D. Anderson, Bryan Leigh, L. Berquist, T. Murphy, J.E. Leonard, G. Braslawsky and N. Hanna. Therapeutic activity of IDEC-114 (anti-CD80) and Rituximab (Rituxan®) in B-Cell lymphoma. 2001. Blood 98 (11), page 608a. *Abstract # 2549.*

7. Pathan N., **K. Hariharan**, M. Hopkins, A. Saven, M. Reff, N. Hanna and P. Grint. Induction of apoptosis by IDEC-152 (anti-CD23) in lymphoma cells. 2001. Blood 98(11), page 367a. *Abstract # 1545.*

8. **Hariharan K**, L. Berquist, T. Murphy, N. Hanna, G. Braslawsky. Therapeutic application of an anti-CD80 antibody (IDEC-114) in B-Cell lymphoma. 17th Annual Meeting of the Society of Biological Therapy. November 8-10, 2002. *Abstract # 12*

9. Pathan, N., **K. Hariharan**, L. Scales, P. Chu., M. Hopkins, A. Saven, P. Grint, and B. Leigh. IDEC-152 (anti-CD23) as a potential therapy for CLL. 17th Annual Meeting of the Society of Biological Therapy. November 8-10, 2002. *Abstract # 17*

10. Pathan, N., P. Chu, L. Scales, **K. Hariharan**, M. Hopkins, A. Saven, P. Grint, B. Leigh. IDEC-152 (anti-CD23) as a potential therapy for CLL. IDEC-152 *American Society for Hematology 2002*